

## CLAIMS

What is claimed is:

Claim 1 - A gas mixture for use as an oxidizer mixture portion of a working fluid in a gas turbine combustor,<sup>1</sup> the mixture comprising in combination:

by weight between about forty percent and about eighty percent carbon dioxide, between about ten percent and about fifty percent water and between about ten percent and about thirty percent oxygen.

Claim 2 - The mixture of Claim 1 wherein said mixture includes by weight between about forty percent and about fifty-five percent carbon dioxide, between about thirty percent and about fifty percent water and between about ten percent and about twenty percent oxygen.

Claim 3 - The mixture of Claim 2 wherein said mixture includes by weight about forty-eight percent carbon dioxide, about thirty-nine percent water and about thirteen percent oxygen.

Claim 4 - The mixture of Claim 1 wherein said mixture includes by weight between about fifty percent and about sixty-two percent carbon dioxide, between about twenty percent and about thirty-five percent water and between about ten percent and twenty-five percent oxygen.

Claim 5 - The mixture of Claim 4 wherein said mixture includes by weight about fifty-six percent carbon dioxide, about twenty-eight percent water and about sixteen percent oxygen.

Claim 6 - The mixture of Claim 1 wherein said mixture includes by weight between about fifty percent and about eighty percent carbon dioxide, between about ten percent and thirty percent water and between about fifteen percent and about thirty percent oxygen.

Claim 7 - The mixture of Claim 6 wherein said mixture includes by weight about sixty-three percent carbon dioxide, about seventeen percent water and about twenty

percent oxygen.

Claim 8 - A gas mixture for use as an oxidizer mixture in a gas turbine combustor, the mixture comprising in combination:

a reactant portion;

a diluent portion;

said diluent portion including a set of diluent constituent chemical species;

said reactant portion including a set of reactant constituent chemical species;

said reactant portion able to react chemically with the fuel to produce a set of product constituent chemical species; and

said set of product constituent chemical species and said set of diluent constituent chemical species having more species in common than species that are distinct between said set of diluent constituent chemical species and said set of product constituent chemical species.

Claim 9 - The mixture of Claim 8 wherein said set of diluent constituent chemical species and said set of product constituent chemical species are substantially similar.

Claim 10 - The mixture of Claim 9 wherein relative amounts of constituent chemical species within said set of diluent constituent chemical species are similar to relative amounts of product constituent chemical species within said set of product constituent chemical species.

Claim 11 - The mixture of Claim 10 wherein said set of product constituent chemical species includes carbon dioxide and water with carbon dioxide forming between about fifty percent and about sixty percent of said set of product constituent chemical species by weight and said water forming between about forty percent and about fifty percent of said set of product constituent chemical species by weight, and wherein said set of diluent constituent chemical species includes carbon dioxide and water with carbon dioxide forming between about fifty percent and about sixty percent by weight of said set of diluent constituent chemical species and said water forming between about forty

percent and about fifty percent by weight of said set of diluent constituent chemical species.

Claim 12 - The mixture of Claim 11 wherein said set of product constituent chemical species includes about fifty-five percent carbon dioxide by weight and about forty-five percent water by weight, and wherein said set of diluent constituent chemical species includes about fifty-five percent carbon dioxide by weight and about forty-five percent water by weight.

Claim 13 - The mixture of Claim 8 wherein said reactant portion includes at least one oxygen containing species.

Claim 14 - The mixture of Claim 13 wherein said reactant portion includes gaseous oxygen molecules ( $O_2$ ).

Claim 15 - The mixture of Claim 14 wherein said reactant portion is substantially entirely gaseous molecular oxygen ( $O_2$ ).

Claim 16 - The mixture of Claim 8 wherein said fuel includes hydrogen and said set of product constituent chemical species includes water.

Claim 17 - The mixture of Claim 16 wherein said fuel includes a hydrocarbon therein and wherein said set of product constituent chemical species includes water and carbon dioxide.

Claim 18 - The mixture of Claim 17 wherein said fuel includes methane.

Claim 19 - The mixture of Claim 18 wherein said reactant portion is substantially entirely gaseous molecular oxygen ( $O_2$ ).

Claim 20 - A gas mixture for use as an oxidizer in a combustor of an at least partially closed cycle power generation system, the gas mixture comprising in combination:

molecular gaseous oxygen ( $O_2$ );

gaseous carbon dioxide ( $CO_2$ );

water vapor ( $H_2O$ ); and

wherein a ratio of carbon dioxide to water within said gas mixture matches a ratio of carbon dioxide to water which occurs when methane ( $\text{CH}_4$ ) combusts with gaseous molecular oxygen ( $\text{O}_2$ ) substantially stoichiometrically.

Claim 21 - The mixture of Claim 20 wherein said mixture includes sufficient oxygen to cause said gas mixture to be compressible in a compressor designed to compress air without requiring compressor modification.

Claim 22 - The mixture of Claim 20 wherein said mixture includes by weight between about forty percent and about eighty percent carbon dioxide, between about ten percent and about fifty percent water vapor and between about ten percent and about thirty percent oxygen.

Claim 23 - The mixture of Claim 20 wherein said ratio of carbon dioxide to water is approximately one carbon dioxide molecule for every two water vapor molecules and about fifty-five percent of a combined weight of the carbon dioxide and the water is carbon dioxide and about forty-five percent of the combined weight of the carbon dioxide and the water is water.